

**Notice of Allowability**

Application No.

10/715,438

Examiner

H. T. Le

Applicant(s)

TON-THAT ET AL.

Art Unit

1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to \_\_\_\_\_.
2. ☒ The allowed claim(s) is/are 1-50.
3. ☒ The drawings filed on 19 November 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

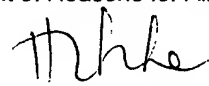
\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date Nov. '03
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

  
H. T. Le  
Primary Examiner  
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### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Hans Koenig on March 18, 2005.

The application has been amended as follows:

Claim 1, last line, after "matrix", the following phrase has been added:

-- , the graft polymer having a matrix compatible portion and an epoxy functionalized portion --.

Claim 13 has been deleted.

Claim 14, line 2, "epoxy-functionalized graft polymer comprise a" has been deleted.

Claim 15, line 2, "epoxy-functionalized graft polymer comprise an" has been deleted;

Line 3, "that" has been deleted.

Claim 34, last line, "or" has been changed to – and --.

Claim 35, last line, "or" has been changed to – and --.

*End of Amendment.*

## **REASONS FOR ALLOWANCE**

2. The following is an examiner's statement of reasons for allowance: None of the prior art references of record, singly or in combination, teach or suggest a nanocomposite, or method of making thereof, comprising a nano-reinforcing material in a polymer matrix and an epoxy-functionalized graft polymer having a portion compatible with the polymer matrix and a portion comprising an epoxy-functionalized group.

The patent WO 00/34393 (Barbee et al) and the US patent 6,384,121 (to Barbee et al) that teach a nanocomposite comprising components similar to those of the claimed invention except that the functionalized compatible polymer is onium-functionalized polymer instead of an epoxy-functionalized graft polymer. Onium ions are known as intercalant for hybrid organic/inorganic composite. Thus, onium ions are a necessary component in the teaching of these references because the reinforcing material is limited to clay (a layered material). The claimed invention on the other hand is not limited to just clay or layered inorganic material. Therefore, it would not have been obvious to omit onium-functional groups or to substitute onium-functional group with an epoxy group.

The Kawasumi article ("Preparation and Mechanical Properties of PP-Clay Hybrids") teaches an organic/inorganic nanocomposite comprising a polymer matrix and an onium-ion intercalated clay. Thus its concept is similar to the teachings of the two patents mentioned above except that the onium-intercalant pre-exists on the surface of the clay instead of coming from the polymeric component.

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3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."
4. References are cited as art of interest.
5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. T. Le whose telephone number is 571-272-1511. The examiner can normally be reached on 10:00 a.m. to 6:30 p.m., Mondays to Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1284.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



H. T. Le  
Primary Examiner  
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